USER MANUAL

Longo programmable controller
LPC-2.DL1 module

Version 3

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Written by SMARTEH d.o.o.

User Manual

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STANDARDS AND PROVISIONS: Standards, recommendations, regulations and provisions of the country in which the devices will operate, must be considered while planning and setting up electrical devices. Work on 230 VAC network is allowed for authorized personnel only.
DANGER WARNINGS: Devices or modules must be protected from moisture, dirt and damage during transport, storing and operation. WARRANTY CONDITIONS: For all modules LONGO LPC-2 – if no modifications are performed upon and are correctly connected by authorized personnel – in consideration of maximum allowed connecting power, we offer warranty for 24 months from date of sale to end buyer. In case of claims within warranty time, which are based on material malfunctions the producer offers free replacement. The method of return of malfunctioned module, together with description, can be arranged with our authorized representative. Warranty does not include damage due to transport or because of unconsidered corresponding regulations of the country, where the module is installed.
This device must be connected properly by the provided connection scheme in this manual. Misconnections may result in device damage, fire or personal injury.
Hazardous voltage in the device can cause electric shock and may result in personal injury or death.
NEVER SERVICE THIS PRODUCT YOURSELF!
This device must not be installed in the systems critical for life (e.g. medical devices, aircrafts, etc.).
If the device is used in a manner not specified by the manufacturer, the degree of protection provided by the equipment may be impaired.
Waste electrical and electronic equipment (WEEE) must be collected separately!
LONGO LPC-2 complies to the following standards:

- EMC:EN 61000-6-2 (EN 50082), EN 61000-6-4 (EN 50081)
- LVD: IEC 61131-2
- Vibrations and climatic-mechanical: EN 60068-2-6, EN 60068-2-27, EN 60068-2-29

Smarteh d.o.o. operates a policy of continuous development. Therefore we reserve the right to make changes and improvements to any of the products described in this manual without any prior notice.

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Longo programmable controller LPC-2.DL1 module

1 DESCRIPTION

LPC-2.DL1 is a master and power supply DALI (Digitally Addressable Lighting Interface) or DSI (Digital serial Interface) module. It can control up to 64 slave DALI devices.

Its main field of application is controlling electronic dimmable ballasts in lighting system.

Module is powered from internal BUS.

NOTE: For proper system configuration and data allocation please refer to LPC Composer software help menu.

2 FEATURES

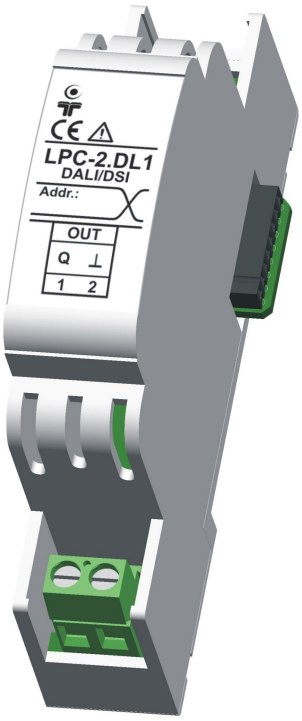


Figure 1: LPC-2.DL1 module

Table 1: Technical data
Standard DALI/DSI master and power supply
Small dimensions and standard DIN EN50022-35 rail mounting
connection up to 64 slave devices

3 OPERATION

LPC-2.ED1 module can be used in different modes of functioning.

With the parameters/commands, various control of DALI or DSI devices can be achieved.

When module is set as DALI master device, module is supporting up to eight DALI addresses and DALI data to work simultaneously. When select as DSI master device, one DSI data channel is supported.

DSI: To select DSI mode of module operation, Device Tx Address "DL1_1a_oAdd" must be set to 255 and Device Tx Data "DL1_1a_oDat" must be set to 254.

To send dim level to DSI device, Device Tx Address "DL1_1b_oAdd" must be set to 0 and corresponding dim level (0..255) must be send to Device Tx Data "DL1_1b_oDat". To stop sending dim level to DSI, 0 must be writen to Device Tx Address "DL1_1b_oAdd".

Other twelve, Device Tx Address "DL1_1x_oAdd" and Device Tx Data "DL1_1x_oDat" parameters do not take effect when module is in DSI mode of operation.

DALI: DALI mode of module operation is automatically selected when Device Tx Address "DL1_1x_oAdd" value is in range 0 to 254 and Device Tx Data "DL1_1x_oDat" value is in range 0 to 255.

DALI address "DL1_1x_oAdd" structure.

DALI address is one byte long,	YAAAAAAS (High bit .. Low bit).
DALI short address 0 .. 63	0AAAAAAS
DALI group address 0 .. 15	100AAAAS
DALI broadcast	11111111S
DALI special commands	101CCCCS and 110CCCCS

A = significant address bit

S = selector bit
- S = 0 direct arc power level following in data byte ("DL1_xa_oDat")
- S = 1 command following in data byte ("DL1_xa_oDat")

C = significant address command bit

Y = short or group address / broadcast
- Y = 0 short address
- Y = 1 group address or broadcast

DALI data "DL1_1x_oDat" structure.
DALI data / command is one byte long, XXXXXXXX (High bit .. Low bit).

For example when writing 2 (00000010) to "DL1_1a_oAdd" and (127) 01111111 to "DL1_1a_oDat", light with DALI ballast with short address 1 will lit with 15% (127) of relative lighting level.

When writing 3 (00000011) to "DL1_1a_oAdd" and (127) 00000000 to "DL1_1a_oDat", DALI command will be sent and DALI device with short address 1 will switch off.

Up to eight different DALI address and data parameters can be written to the module at the same time.

Corresponding answer from DALI device can be read from "DL1_1x_iDat" value and corresponding DALI device address is echoed to "DL1_1x_iAdd" value.

When one or more of DALI addresses and commands (channels) are not used, "DL1_1x_oAdd" and Device Tx Data "DL1_1x_oDat" parameters for unused channel must be set to 255.

For detail description of DSI (Digital Serial Interface) please refer to DSI documentation.
For detail description of DALI (Digitally Addressable Lighting Interface) please refer to IEC929 Annex E or other documentation.

Functions and possibilities will be described within parameters description.

3.1 Parameters

If parameter is set to logical “1”, is considered to be active, enabled or set. If parameter has logical value “0” is considered to be inactive, disabled, or cleared.

Parameter can be status or command or both. When parameter is marked as status this means that module is sending information to controller. On the other hand command represents request from MCU to module.

Device Tx address parameter: DSI or DALI selection and DALI address data parameter. When 255 is written to this parameter “DL1_1a_oAdd”, DSI is selected. When 0 .. 254 is written to this parameter, DALI address / command is sent to DALI device. When some DALI channels (1 .. 8) are not used, write 255 to corresponding parameters (“DL1_1a_oAdd” .. “DL1_1h_oAdd”).

Device Tx data parameter: DSI selection and DALI data parameter. When 254 is written to (“DL1_1a_oDat”) and 255 is written to “DL1_1a_oAdd” parameters, DSI is selected. In DALI mode data / command for corresponding DALI channel should be written to this parameter. When some DALI channels (1 .. 8) are not used, write 255 to corresponding parameters (“DL1_1a_oDat” .. “DL1_1h_oDat”).

Device Rx address value: Corresponding DALI device address is echoed to “DL1_1x_iAdd” value.

Device Rx data value: Corresponding answer from DALI device can be read from “DL1_1x_iDat” value.

3.2 Variables memory list

Table 2: Parameters

Memory	Variable description	Range	Values
DL1_1a_oAdd	1. Device Tx Address	0..255	0..255
DL1_1a_oDat	1. Device Tx Data	0..255	0..255
DL1_1b_oAdd	2. Device Tx Address	0..255	0..255
DL1_1b_oDat	2. Device Tx Data	0..255	0..255
DL1_1c_oAdd	3. Device Tx Address	0..255	0..255
DL1_1c_oDat	3. Device Tx Data	0..255	0..255
DL1_1d_oAdd	4. Device Tx Address	0..255	0..255
DL1_1d_oDat	4. Device Tx Data	0..255	0..255
DL1_1e_oAdd	5. Device Tx Address	0..255	0..255
DL1_1e_oDat	5. Device Tx Data	0..255	0..255
DL1_1f_oAdd	6. Device Tx Address	0..255	0..255
DL1_1f_oDat	6. Device Tx Data	0..255	0..255
DL1_1g_oAdd	7. Device Tx Address	0..255	0..255
DL1_1g_oDat	7. Device Tx Data	0..255	0..255
DL1_1h_oAdd	8. Device TxAddress	0..255	0..255
DL1_1h_oDat	8. Device Tx Data	0..255	0..255

Table 3: Values			
Memory	**Variable description**	**Range**	**Values**
DL1_1a_iAdd	1. Device Rx Address	0..255	0..255
DL1_1a_iDat	1. Device Rx Data	0..255	0..255
DL1_1b_iAdd	2. Device Rx Address	0..255	0..255
DL1_1b_iDat	2. Device Rx Data	0..255	0..255
DL1_1c_iAdd	3. Device Rx Address	0..255	0..255
DL1_1c_iDat	3. Device Rx Data	0..255	0..255
DL1_1d_iAdd	4. Device Rx Address	0..255	0..255
DL1_1d_iDat	4. Device Rx Data	0..255	0..255
DL1_1e_iAdd	5. Device Rx Address	0..255	0..255
DL1_1e_iDat	5. Device Rx Data	0..255	0..255
DL1_1f_iAdd	6. Device Rx Address	0..255	0..255
DL1_1f_iDat	6. Device Rx Data	0..255	0..255
DL1_1g_iAdd	7. Device Rx Address	0..255	0..255
DL1_1g_iDat	7. Device Rx Data	0..255	0..255
DL1_1h_iAdd	8. Device Rx Address	0..255	0..255
DL1_1h_iDat	8. Device Rx Data	0..255	0..255

4 INSTALLATION

4.1 Connection scheme

Figure 2: Connection scheme

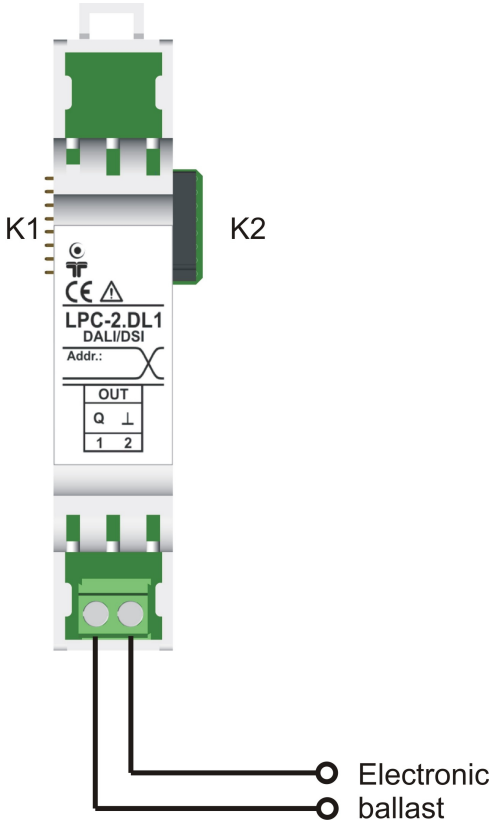


Table 2: OUT[1]		
OUT.1 (Q)	Digital serial output in reference to OUT.2, 0..18 VDC	Digital serial output
OUT.2 (⊥)	Reference	Reference to 15 V D

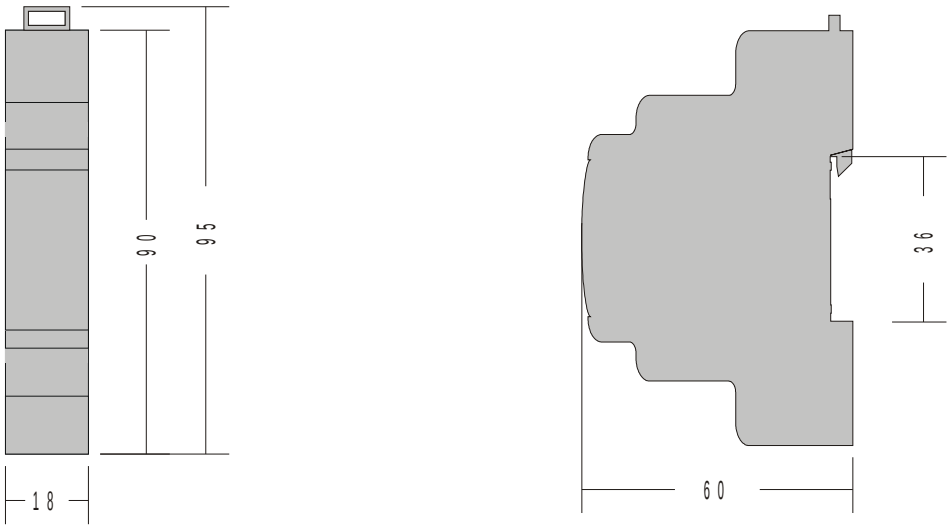
Table 3: K1		
Internal BUS	Data & DC power supply	Connection to I/O module

Table 4: K2		
Internal BUS	Data & DC power supply	Connection to I/O module

1 Wires connected to the module must have cross sectional area at least 0.75 mm^2. Minimum temperature rating of wire insulation must be 85 °C.

4.2 Mounting instructions

Figure 3: Housing dimensions



- Dimensions in millimeters.

All connections, module attachments and assembling must be done while module is not connected to the main power supply.

Mounting instructions:

1. Switch OFF main power supply.
2. Mount LPC-2.DL1 module to the provided place inside an electrical panel (DIN EN50022-35 rail mounting).
3. Mount other LPC-2 modules (if required). Mount each module to the DIN rail first, then attach modules together through K1 and K2 connectors.
4. Connect digital serial output wires according to the connection scheme in Figure 2.
5. Switch ON main power supply.

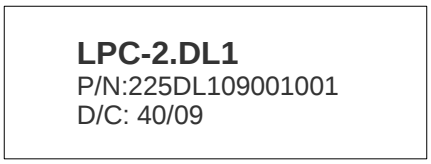
Dismount in reverse order. For mounting/dismounting modules to/from DIN rail a free space of at least one module must be left on the DIN rail.

NOTE: LPC-2 main control module should be powered separately from other electrical appliance connected to LPC-2 system. Signal wires must be installed separately from power and high voltage wires in accordance with general industry electrical installation standard.

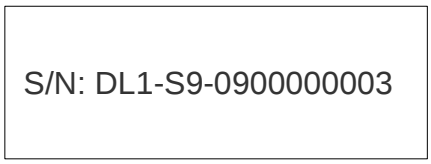
4.3 Module labeling

Figure 5: Labels on housing

Label 1:



Label 2:



Label 1 description:

1. **LPC-2.DL1** is the full product name.
2. **P/N:225DL1080001001** is the part number.
   - **225** – general code for LPC-2 product family,
   - **DL1** – short product name,
   - **08001** – sequence code,
     - 08 – year of code opening
     - 001 – derivation code
   - **001** – version code (reserved for future HW and/or SW firmware upgrades).
3. **D/C:16/08** is the date code.
   - **16** – week and
   - **08** – year of production.

Label 2 description:

1. **S/N:DL1-S9-0800000190** is the serial number.
   - **DL1** – short product name,
   - **S9** – user code (test procedure, e.g. Smarteh person xxx),
   - **0800000190** – year and current stack code,
     - 08 – year (last two cyphers)
     - 00000190 – current stack number; previous module would have the stack number 00000189 and the next one 00000191.

5 TECHNICAL SPECIFICATIONS

Table 5: Technical specifications	
Power supply	from internal BUS
Power consumption	2 W
Number of standard DSI or DALI outputs	1
Connection type	screw type connector for stranded wire 0.75 to 2.5 mm^2
Dimensions (L x W x H)	90 x 18 x 60 mm
Weight	50 g
Ambient temperature	0 to 50 °C
Ambient humidity	max. 95 %, no condensation
Maximum altitude	2000 m
Mounting position	vertical
Transport and storage temperature	-20 to 60 °C
Pollution degree	2
Overvoltage category	II
Electrical equipment	Class II (double insulation)
Protection class	IP 30

6 CHANGES

The following table describes all the changes to the document.

Date	V.	Description
1.7.2012	003	CGP General update.
10.20.2011	002	Updated version and “3 Operation” chapter added.
29.2.2009	001	The initial version, issued as *LPC-2.DL1 module UserManual*.

7 NOTES